

23. The deficiency inspection method according to claim 22, wherein in the step of detecting, a deficiency on said surface is detected by using information of luminance of said green (G) signal component of said image .

24. A deficiency inspection method based on a magnetic-particle inspection scheme, comprising the steps of:

irradiating ultraviolet rays on a surface of a specimen to which a solution containing fluorescent magnetic powder is applied ;

picking up an image of said - surface irradiated with said ultraviolet rays by a color video camera; and

displaying an image acquired by said color video camera on a screen in nearly the same state as an image acquired by visually observing said surface irradiated with ultraviolet rays.

25. A deficiency inspection method based on a magnetic-particle inspection scheme, comprising the steps of:

irradiating ultraviolet rays on a surface of a specimen to which a solution containing fluorescent magnetic powder is applied;

picking up an image of said surface irradiated with ultraviolet rays by a color video camera via an ultraviolet-rays cutting filter;

extracting a deficiency and deficiency candidates from an image acquired by said color video camera; and

displaying on a screen images of said extracted deficiency and deficiency candidates .

26. A deficiency inspection method based on a penetrant inspection scheme, comprising the steps of:

picking up an image of a surface of a specimen by using a color video camera; and

detecting a deficiency candidate on said surface using information about chromaticity and luminance obtained from said image picked up by said color video camera.

27. A deficiency inspection method based on a penetrant-inspection scheme, comprising the steps of:

illuminating a surface of a specimen with polarized light;

picking up an image of said surface illuminated with said polarized light by a color video camera via a polarization filter;

extracting deficiency candidates from said image acquired by said color video camera; and

displaying images of said extracted deficiency candidates on a screen.

28. The deficiency inspection method for magnetic-particle-inspection or penetrant-inspection, comprising the steps of:

picking up an image of a surface of a specimen by a color video camera with positional information of a visual field of said color video camera;

detecting deficiency candidates in said surface by processing a color video signal of said image acquired by said color video camera;

displaying images of said detected deficiency candidates on a screen together with said positional information of said visual field; and

extracting true defect among said defect candidate by using information of feature characteristics.

29. The deficiency inspection method according to claim 28, wherein said positional information of said visual field is originated from a scale arranged in said visual field.

30. The deficiency inspection method according to any one of claims 22-29, wherein said image of said surface is picked up by said color video camera over plural visual fields.

31. A deficiency inspection method for magnetic-particle-inspection or penetrant inspection, comprising the steps of:

 taking an image of a surface of a specimen by a camera;
 detecting deficiency candidates in said surface from said image taken by said camera;
 displaying images of said extracted deficiency candidates on a screen; and
 distinguishing a pseudo deficiency among said deficiency candidates displayed on said screen.

32. A deficiency inspection method comprising the steps of:
 picking up an image of a surface of a specimen by image pickup means;
 detecting deficiency candidates in said surface among said image acquired by said image pickup means;
 displaying images of said detected deficiency candidates on a screen; and
 storing said displayed image of said deficiency candidates with information of feature characteristics of said deficiency candidate in a memory.

33. A deficiency inspection apparatus for magnetic-particle-inspection or penetrant inspection, comprising:

illumination means for illuminating a surface of a specimen;

image pickup means for picking up an image of said surface by a color video camera through a filter;

deficiency-candidate detecting means for detecting deficiency candidates and their features in shape from said image picked up by said image pickup means; and

display means for displaying images of said deficiency candidates detected by said deficiency-candidate detecting means.

34. The deficiency inspection apparatus according to claim 33, wherein said illumination means has an ultraviolet-rays illuminating section for illuminating ultraviolet rays onto said surface of said specimen, and a white-light illuminating section for illuminating white light onto said surface of said specimen.

35. A deficiency inspection apparatus, comprising:

illumination means for illuminating a surface of a specimen;

image pickup means for picking up an image of said surface by a color video camera;

magnetic-particle-inspection-originated deficiency-candidate extraction means for extracting magnetic-particle-inspection originated deficiency candidates in said surface from said image of said surface picked up by said image pickup means;

penetrant-inspection-originated deficiency-candidate extraction means for extracting penetrant-inspection-originated deficiency candidates in said surface from said image of said surface picked up by said image pickup means; and

display means for displaying images of said deficiency candidates detected by said magnetic-particle-inspection-originated deficiency-candidate extraction means or said penetrant-inspection-originated deficiency-candidate extraction means.

36. A deficiency inspection apparatus for magnetic-particle-inspection or penetrant inspection, comprising:

an illuminator which illuminates a surface of a specimen;
a camera which picks up an image of said surface;
a deficiency-candidate detector which detects deficiency candidates on said surface from said image of said surface picked up by said camera;
a storage section which stores images of said deficiency candidates detected by said deficiency-candidate detector; and
display unit which displays information of said images of said deficiency candidates stored in said storage section on a screen.

37. A deficiency inspection apparatus, comprising:

ultraviolet-rays irradiation means for irradiating ultraviolet rays to a surface of a specimen to which a solution containing fluorescent magnetic powder is applied;
image pickup means for picking up an image of said surface irradiated with ultraviolet rays by a color video camera; and
display means for displaying said image of said surface picked up by said image pickup means on a screen in nearly the same state as an image acquired by said visual observation.

38. A deficiency inspection apparatus based on a probing scheme, comprising:

ultraviolet-rays irradiation means for irradiating ultraviolet rays to a surface of a specimen to which a solution containing fluorescent magnetic powder is applied;

image pickup means for picking up an image of said surface irradiated with said ultraviolet rays by a color video camera via an ultraviolet-rays cutting filter;

deficiency-candidate detecting means for detecting deficiency candidates and features thereof based on shape from said image of said surface picked up by said image pickup means; and

display means for displaying images of said deficiency candidates detected by said deficiency-candidate detecting means.

39. A deficiency inspection apparatus, comprising:

ultraviolet-rays irradiation means for irradiating ultraviolet rays to a surface of a specimen to which a solution containing fluorescent magnetic powder is applied;

image pickup means for picking up a fluorescent image of said surface irradiated by said ultraviolet rays emanated from said ultraviolet-rays irradiation means by a color video camera;

deficiency-candidate detecting means for detecting deficiency candidates on said surface using information of luminance of a green (G) signal component in a color image signal output from said image pickup means; and

display means for displaying images of said deficiency candidates detected by said deficiency-candidate detecting means.

40. A deficiency inspection apparatus, comprising:

illumination means for illuminating a surface of a specimen to which a penetrant is temporarily applied with white light;

image pickup means for picking up an image of said surface by a color video camera;

magnetic-particle-inspection-originated deficiency-candidate detecting means for detecting magnetic-particle-inspection originated deficiency candidates on said surface from said image of said surface picked up by said image pickup means;

penetrant-inspection-originated deficiency-candidate detecting means for detecting penetrant-inspection-originated deficiency candidates on said surface from said image picked up by said image pickup means; and

display means for displaying images of said deficiency candidates detected by said magnetic-particle-inspection-originated deficiency-candidate detecting means or said penetrant-inspection-originated deficiency-candidate detecting means.

41. The deficiency inspection apparatus according to any one of claims 33 to 40, wherein positional information display means for displaying positional information of a visual field of said color video camera is arranged in said visual field.

42. The deficiency inspection apparatus according to claim 40, wherein said positional information display means is a scale.--

REMARKS

Reference is made to the recent telephone conversation with the Examiner, Mr. Pitts, wherein it was pointed out that although the Office Action indicates that claims 1-42 are present in the application and apparently only sets forth a rejection of claims 1-42 under 35 U.S.C. §112, applicants are unaware of the Examiner's indication of forty-two (42) claims being present in this application. Applicants explained that as originally filed, claims 1-21 were present in the application which was filed as a National Stage of a PCT application, with the application as filed being a translation of the PCT application for which the filing receipt indicates a total of twenty-one (21) claims. Submitted with such application was a copy of the